

5. Communication Channels

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5. Communication Channels

The forecasts and various products that the NWS develops would be of no use without proper communication channels to get this information to the users of the products. This section will list and discuss the numerous ways the forecast and other products are disseminated throughout the country.

NWS Websites (www.weather.gov)

With emerging technologies, the most widely accessible venue for receiving watches, warnings and forecast information and other hydrology and climatology data has grown to be the local office websites. Nearly all products developed by the NWS office are available on individual websites. Local office websites are examined in detail in the web section.

NWSChat

<https://nwschat.weather.gov/>

NWSChat is a tool developed for direct communication between the NWS office and broadcast meteorologists, emergency managers and other specific partner organizations. The goal of NWSChat is for the users to pass on important information about current weather and flood situations. For example, if a viewer calls a TV station to report baseball size hail, the meteorologists at that station can quickly relay the report onto the NWS office. The NWS office can also provide information to the partners in chat that may be useful, but won't be specifically worded in a warning or other public product. Warnings and other products issued by the NWS are automatically fed into the chat for quick viewing. At this time, use of NWSChat is limited to very specific organizations (e.g., broadcast meteorologists, emergency man-

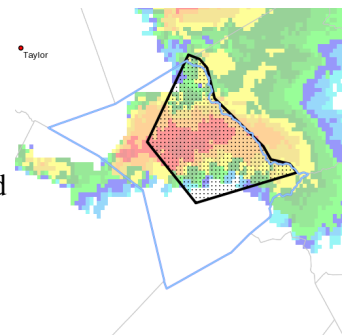
iNWS

<http://inws.wrh.noaa.gov/>

iNWS (InteractiveNWS) Alerts allow users to configure and receive text message alerts and e-mail message alerts when the NWS issues a watch, warning or advisory that affects them.

Users can configure their alert preferences geographically and by weather phenomena.

iNWS is intended for members of community emergency planning and response management (i.e. emergency managers, law enforcement managers, fire and emergency response managers, transportation and safety managers, public officials), Skywarn Net Control operators and government partners of NWS offices.



Social Networking

<http://www.weather.gov/socialmedia>

Social networking has become an important way to disseminate products and information to the public. Every NWS forecast office has a facebook page to post information and also to get information such as storm reports. There is also a national NWS Facebook page where interesting/important information is posted nationally. Many offices also have twitter accounts for disseminating and collecting information such as storm reports. Further development into social networking is expected in the coming years.

FEMA's **Integrated Public Alert and Warning System (IPAWS)** is a comprehensive, coordinated system that can be used by authorized public officials to deliver effective alert messages to the American public. IPAWS ensures the President can alert and warn the public under any condition. Additionally, IPAWS allows alerting authorities to write their own message using commercially available software that is compliant with open standards. The message is then delivered to the IPAWS Open Platform for Emergency Networks (OPEN) where it is authenticated, and then delivered simultaneously through multiple communications pathways reaching as many people as possible to save lives and protect property. IPAWS is the means for our nation to fulfill Executive Order (E.O.) 13407, signed on June 26, 2006, which established as policy the requirement for the United States to have an effective, reliable, integrated, flexible, and comprehensive system to alert and warn the American people.

To ensure message access and consistency across multiple dissemination systems, FEMA and its partners have adopted the Common Alerting Protocol (CAP) and the IPAWS CAP Profile. CAP is a simple, flexible data-interchange format for collecting and distributing "all-hazard" safety notifications and emergency warnings over information networks and public alerting systems. CAP provides compatibility with all kinds of information and public alerting systems, including those designed for multilingual access and functional needs populations.

FEMA's partners in the development of the IPAWS program include:

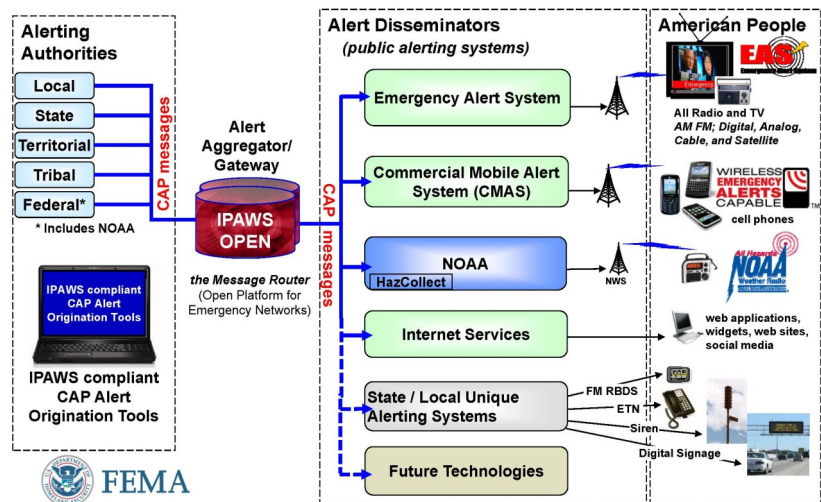
- The Federal Communications Commission (FCC) establishes the rules for broadcasters, cable system operators, and other participants regarding the technical requirements of the Emergency Alert System (EAS) and the rules for commercial mobile service providers who opt to participate in the voluntary Commercial Mobile Alert System/Wireless Emergency Alerts (CMAS/WEA).
- The National Weather Service (NWS) provides emergency weather and tsunami information to alert the public of dangerous local weather conditions and other emergencies. Go to <http://alerts.weather.gov/> for more information on the NWS implementation of CAP.

IPAWS Framework

Authorities in charge of alerting their communities of all hazards can do so using IPAWS-compliant alert origination tools (to learn more please visit <http://www.fema.gov/alerting-authorities>). These tools are software used by emergency managers, public safety officials, and other alerting authorities to create and send critical life saving messages to the public. The centralized alert aggregator/gateway receives these CAP alert messages, authenticates the sender, and forwards the alerts to IPAWS-compliant dissemination systems. We will detail a few of these IPAWS-compliant dissemination systems on the following pages.

IPAWS Architecture

Standards based alert message protocols, authenticated alert message senders, shared, trusted access & distribution networks, alerts delivered to more public interface devices



CMAS/WEA

http://www.ctia.org/consumer_info/safety/index.cfm/AID/12082

<http://www.nws.noaa.gov/com/weatherreadynation/wea.html>

CMAS/WEA (**Commercial Mobile Alert System/Wireless Emergency Alerts**) is a relatively new message dissemination pathway that sends warnings via cell phones and other mobile devices. FEMA’s “CMAS” component simply refers to the IPAWS-OPEN interface explained on the previous page. The CMAS capability is what sends alerts and warnings to the participating wireless carriers for use in their WEA service. WEAs will relay Presidential, AMBER, and other extreme/severe threat alerts to mobile phones using cell broadcast technology that will not get backlogged during times of emergency when wireless voice and data services are highly congested. For the end-user WEA is an opt-out service (except for Presidential messages which will always be received). WEA service is also dependent on the type of wireless device owned—older devices are not likely capable of receiving the alerts. End-users must work with their wireless providers in order to receive and manage WEA services.

WEA Messages Originated by NWS

When new alert or correction issued or time/area extended

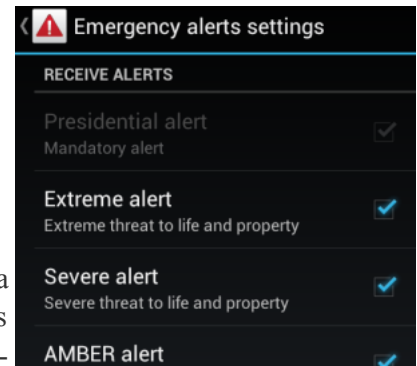
Warning Type	WEA Message
Tsunami Warning	Tsunami danger on the coast. Go to high ground or move inland. Check local media. -NWS
Tornado Warning	Tornado Warning in this area til hh:mm tzT. Take shelter now. - NWS
Extreme Wind Warning	Extreme Wind Warning this area til hh:mm tzT ddd. Take shelter. - NWS
Flash Flood Warning	Flash Flood Warning this area til hh:mm tzT. Avoid flooded areas. Check local media. -NWS
Hurricane Warning	Hurricane Warning this area til hh:mm tzT ddd. Check local media and authorities. -NWS
Typhoon Warning	Typhoon Warning this area til hh:mm tzT ddd. Check local media and authorities. -NWS
Blizzard Warning	Blizzard Warning this area til hh:mm tzT ddd. Prepare. Avoid Travel. Check media. -NWS
Ice Storm Warning	Ice Storm Warning this area til hh:mm tzT ddd. Prepare. Avoid Travel. Check media. -NWS
Dust Storm Warning	Dust Storm Warning in this area til hh:mm tzT ddd. Avoid travel. Check local media. -NWS

Legend
tzT = timezone
ddd= three letter abbreviation for day of the week

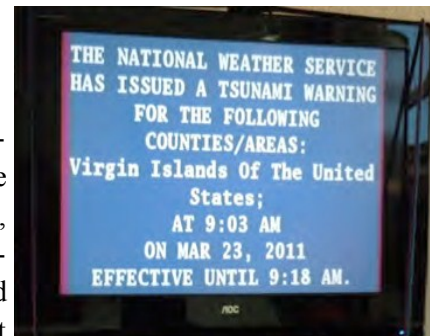
Emergency Alert System (EAS)

<http://transition.fcc.gov/pshs/services/eas/>

The Emergency Alert System (EAS) is one of the many means used by alerting authorities to send county-based warnings via broadcast, cable, satellite, and wireline communications pathways. Voluntary EAS Participants, which consist of broadcast, cable, satellite, and wireline providers, are the stewards of this important public service in close partnership with alerting officials at all levels of government. Local and State EAS Committees work to implement this public emergency service in the most effective manner for their jurisdictions. The EAS is in a constant state of improvement to assure seamless integration of CAP-based and emerging technologies. NOAA Weather Radio remains the primary means that the NWS activates the EAS. Eventually the EAS will be activated solely through the IPAWS-OPEN interface thanks to the CAP capability being implemented by the cable, satellite, and wireline providers. This should lead to an enhanced EAS that more accurately activates broadcast reception devices that are geographically located in (or very near) harm’s way.



Currently WEA is intended to be a complementary warning service to the Emergency Alert System. It gives a 90-character heads-up on a hazard within the county the wireless device is located. As of this November 2012 update, NWS is sending the warnings in the adjacent table thorough the IPAWS- OPEN interface and onto the wireless carrier’s WEA service. As the IPAWS consortium, including the wireless carriers, is able to enhance the geo-targeting capability of the WEA service, additional NWS warnings—such as severe thunderstorm warnings—will be added. Eventually WEA will become an invaluable alert and warning service that more accurately activates devices that are geographical-ly located in (or very near) harm’s way.



NOAA Weather Radio

<http://www.nws.noaa.gov/nwr/>

NOAA Weather Radio All Hazards (NWR) is a nationwide network of radio stations broadcasting continuous weather and water information directly from the nearest NWS forecast office. NWR broadcasts official NWS warnings, watches, forecasts and other hazard information 24 hours a day, seven days a week.

Working with the Federal Communication Commission's (FCC) Emergency Alert System, NWR is an "All Hazards" radio network, making it your single source for comprehensive weather and emergency information. In conjunction with Federal, state and local emergency managers and other public officials, NWR also broadcasts warning and post-event information for all types of hazards, including natural (such as earthquakes or avalanches), environmental (such as chemical releases or oil spills) and public safety (such as AMBER alerts or 911 telephone outages).

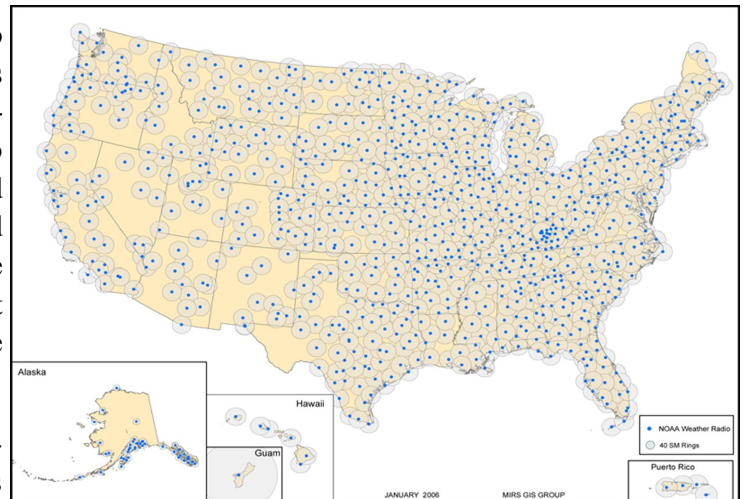
Known as the "Voice of the National Weather Service," NWR is provided as a public service by NOAA. NWR includes 1013 transmitters, covering all 50 states, adjacent coastal waters, Puerto Rico, the U.S. Virgin Islands and the U.S. Pacific Territories.

162.400	162.425	162.450	162.475	162.500	162.525	162.550
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NWR requires a special radio receiver or scanner capable of picking up the signal. Broadcasts are found in the VHF public service band at these seven frequencies (MHz):

Most NOAA Weather Radio All Hazards receivers have a tone-alert feature that can be set to alert mode for automatic activation when certain watches and warnings are issued. Higher grade models can be programmed to activate for user specified counties. All NWS products have the capability of being tone-alerted. To prevent unnecessary alerts and to maintain the proper hierarchy of products, most WFOs only choose to alert short-fused headlines that require urgent action to protect lives and property, such as tornado watches and warnings, severe thunderstorm watches and warnings, flash flood warnings, hurricane headlines and tsunami headlines. In coordination with local and state EAS committees, some NWS forecast offices tone-alert winter weather headlines such as blizzard warnings and ice storm warnings.

The NWR transmitter network is officially one of the dissemination pathways available to all alerting authorities through IPAWS-OPEN interface. A future goal for the



The NOAA Weather Radio Transmitter Network

NAWAS

The National Warning System (NAWAS) is a comprehensive party-line network of telephone circuits connecting state and Federal warning points throughout the United States. It is funded by the Federal Emergency Management Administration (FEMA). Although NAWAS is a national system, the day-to-day operation is under the control of individual states. Each state has its own plan for the use of NAWAS during weather emergencies. NWS offices use this circuit in accordance with individual state plans. Normally, all warnings and watches will be disseminated on the appropriate NAWAS by the issuing office.

HazCollect

<http://www.nws.noaa.gov/os/hazcollect>

FEMA and the National Weather Service (NWS) have partnered to operate the **All-Hazards Emergency Message Collection System** (HazCollect) to deliver “Non-Weather Emergency Messages” (NWEMs) through the IPAWS OPEN interface. Examples of NWEMs are provided in the chart below. The main advantage for using HazCollect as an additional method for public warning is that it provides alerting authorities with the ability to send their messages through the NWS family of dissemination services including NOAA Weather Radio. This greatly increases the number of alerting channels and enhances the likelihood of timely receipt by the impacted public.

Government organizations responsible for public alerting that wish to utilize HazCollect must first acquire the necessary authoring software. Private sector software providers continue to develop tools that alerting officials can acquire to compose and transmit public alerts to HazCollect through IPAWS. A list of third-party developers is available online here: <http://www.fema.gov/library/viewRecord.do?id=5670>. A Memorandum of Agreement (MOA) governing system security must be executed with FEMA to establish an IPAWS account. Once an IPAWS account has been established, the organization must apply to the National Weather Service for HazCollect access.

Non-Weather Emergency Message Types			
ADR	Administrative/Follow-up Message	LEW	Law Enforcement Warning
CAE**	Child Abduction Emergency	CDW	Civil Danger Warning
LAE	Local Area Emergency	CEM	Civil Emergency Message
TOE	911 Telephone Outage Emergency	EQW	Earthquake Warning
AVA	Avalanche Watch	AVR	Avalanche Warning
NUW	Nuclear Power Plant Warning	EVI	Evacuation Immediate
RHW	Radiological Hazard Warning	FRW	Fire Warning
SPW	Shelter-in-Place Warning	HMW	Hazardous Materials Warning
VOW	Volcano Warning	DMO*	Demonstration Message

GIS/Open Data Formats

<http://www.nws.noaa.gov/gis/>

The National Weather Service produces many of its data sets in formats available for import into Geographic **Information Systems** (GIS). The link above is the best place to start for NWS GIS data. Through this portal we provide our data in Common Alerting Protocol, KML (Keyhole Markup Language), Shapefiles, and (OGC) Open Geospatial Consortium standards for web services.

<http://water.weather.gov/ahps/inundation.php>

River Flood Inundation Maps are a great example of the application of hazard data available through GIS. They show the extent of flooding expected spatially over a given area. The maps are an evolution of the National Weather Service’s Advanced Hydrologic Prediction Service and have been developed in partnership with Army Corps of Engineers, state and local emergency management and other organizations. Through Google maps and GIS layers our web interface can show assets (roads, buildings, bridges, etc.) that are forecast to be inundated by flooding. For planning purposes the maps can also show the inundation for various levels of flooding (minor, moderate, major, historic record).

America's Weather and Climate Industry

<http://www.nws.noaa.gov/im/>

The key to fulfilling the NWS' mission of protecting life and property from weather and flood hazards is its partnerships. The Integrated Warning Team includes NWS, emergency management and America's Weather and Climate Industry (AWCI). AWCI is a tremendous partner in interpreting NWS data and information and providing it to the public as well as to the business community that drives our nation's economy. AWCI includes all elements of the private sector (including media, consultants, equipment providers, etc.) which provide services to the public in the areas of climate, water, and weather. NWS does not endorse any particular service provider, but we maintain a list of those available at web site above.

NOAA Weather Wire Service (NWWS)

The NWS mission to protect life and property and to enhance the national economy, is carried out by timely delivery through the NWWS of text and graphical products, including warnings, watches, forecasts and other relevant weather, hydrologic, climate and critical non-weather-related information.

NWWS is designed to deliver high priority watch and warning products to users within 10 seconds, and all other products within 30 seconds.

The NWWS is a satellite-based data collection and dissemination system operated by the NWS.

Users have three options for receiving NWWS information: C-band satellite, Ku-band satellite and the Internet, each with its specific advantages, depending on user needs. All NWWS users, including the NWS uplink sites, receive the entire NWWS data stream as part of the outgoing satellite broadcast. Commercial software is available for users to select, manipulate, alarm, display and archive information they require on various devices.

The national master database list managed by the NWS Office of Operational Systems and maintained by the contractor includes all products transmitted on the NWWS. Representative products, each in text format and some in graphical format, include weather warnings, watches, advisories and forecasts; critical non-weather-related warnings; national public weather summaries and tables; and such routine locally prepared products as state, zone and short-term forecasts; weather summaries, climate data and local observations; marine forecasts and other information, and fire pre-suppression forecasts.

Family of Services (FOS)

The Family of Services (FOS) was established to make weather information available to external users. The FOS provides external users access to near real-time weather data and information on the NWS Telecommunications Gateway NOAAnet Multi Protocol Label Switching System (MPLS) Network.

The objective of the FOS is to provide the commercial meteorological community, the academic community and other Federal agencies with access to near real-time weather information.

Current Directive: <http://www.nws.noaa.gov/directives/sym/pd06010curr.pdf>

Additional Information:

Emergency Managers Weather Information Network (EMWIN)

<http://www.weather.gov/emwin/>

Emergency Managers Weather Information Network (EMWIN) offers an economical way to receive all products available on the NWWS, plus graphical forecasts and select satellite data. Compared to the NWWS, an additional broadcast delay of 5 to 20 seconds can be expected for watches and warnings. The EMWIN system is monitored 24 hours a day, 7 days a week, and has an estimated availability of at least 99%. The service itself is free. As a satellite broadcast system, there are short outages of several minutes duration (60 minutes worst case) during a 3 to 4 day satellite eclipse period, which occurs in the Spring and Fall. The NWWS has backup provisions for such occurrences, whereas EMWIN does not. A backup data source, such as the internet, might be considered during such scheduled outages.

EMWIN is a nonproprietary operational dissemination system developed in the NWS Office of Operational Systems (OPS) primarily for the emergency management community. It provides a continuous, dedicated low speed data broadcast of up to 5,000 pages per day using an audio signal from the GOES satellite or terrestrial retransmitter. The EMWIN data stream consists of:

- Real-time weather warnings, watches, advisories, forecasts
- A subset of alphanumeric products for each state
- A limited suite of non-value added graphical products
- Satellite imagery

End user software provides a friendly environment to monitor the weather, set alarms, auto-print, etc., from a personal computer.

The EMWIN data stream was designed to run at minimal cost to the NWS and at no recurring costs to users in range of the signal. Basic software developed, but unsupported, by the NWS to meet minimum needs of users is available for free and can be downloaded. The EMWIN data stream can effectively meet the needs of public safety managers, schools, and

Interactive Weather Information Network (IWIN)

<http://www.weather.gov/view/national.php?thumbs=on>

Interactive Weather Information Network (IWIN) is an internet site with real-time data very similar to EMWIN data. It is open to any and all users and contains real-time warnings in addition to many routine NWS products. IWIN depends on the availability of the internet, which is not always reliable during major weather events, due to connection problems either at the user end or at NOAA/NWS due to current Internet bandwidth limitations. The types of data available on IWIN include all standard warnings, watches, advisories and routine data, including state forecasts, short term forecasts

NOAAPORT

<http://www.nws.noaa.gov/noaaport/html/noaaport.shtml>

The *NOAAPORT* broadcast system provides a one-way broadcast communication of NOAA environmental data and information in near real time to NOAA and external users. This broadcast service is implemented by a commercial provid-